

## 4.1 Flow Rate Verification and Adjustment

Once the pressure verification is complete (see Chapter 3), the gas flow rate should be verified. Accurate gas flow through the nozzle is critical for achieving repeatable results. The DRS25 incorporates a Mass Flow Controller with closed loop control to monitor and regulate gas flow rates.

The two areas of flow verification include the Nozzle Flow Controller, which controls actual flow rates and the Nozzle Flow Sensor, which controls the Computer Digital Flow Display. Nozzle flow verification is required for initial installation, or any time the machine is disconnected and/or moved.

### 4.1.1 Nozzle Flow Controller Verification and Adjustment

#### Materials required:

- Scribed reference flow meter supplied with the machine.

#### Initial conditions:

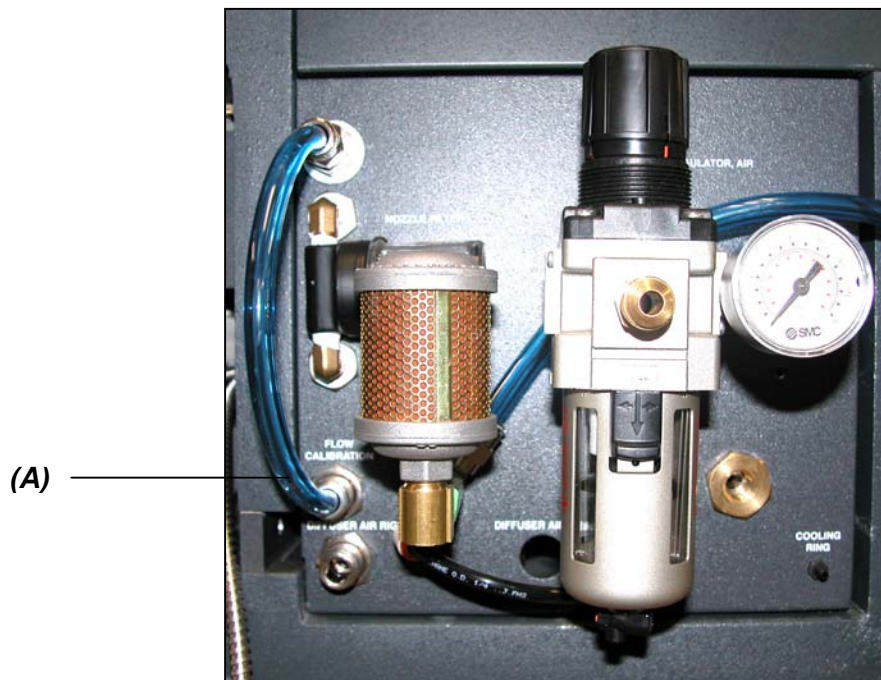
- Pressure to upper heater must be set precisely to 80 psi (+/- .5psi).

#### Set-up:

- Disconnect the current Blue Hose from the Flow Cal Fitting (A).
- Connect the Blue Hose from the Flow Meter into the Flow Cal Fitting (A).

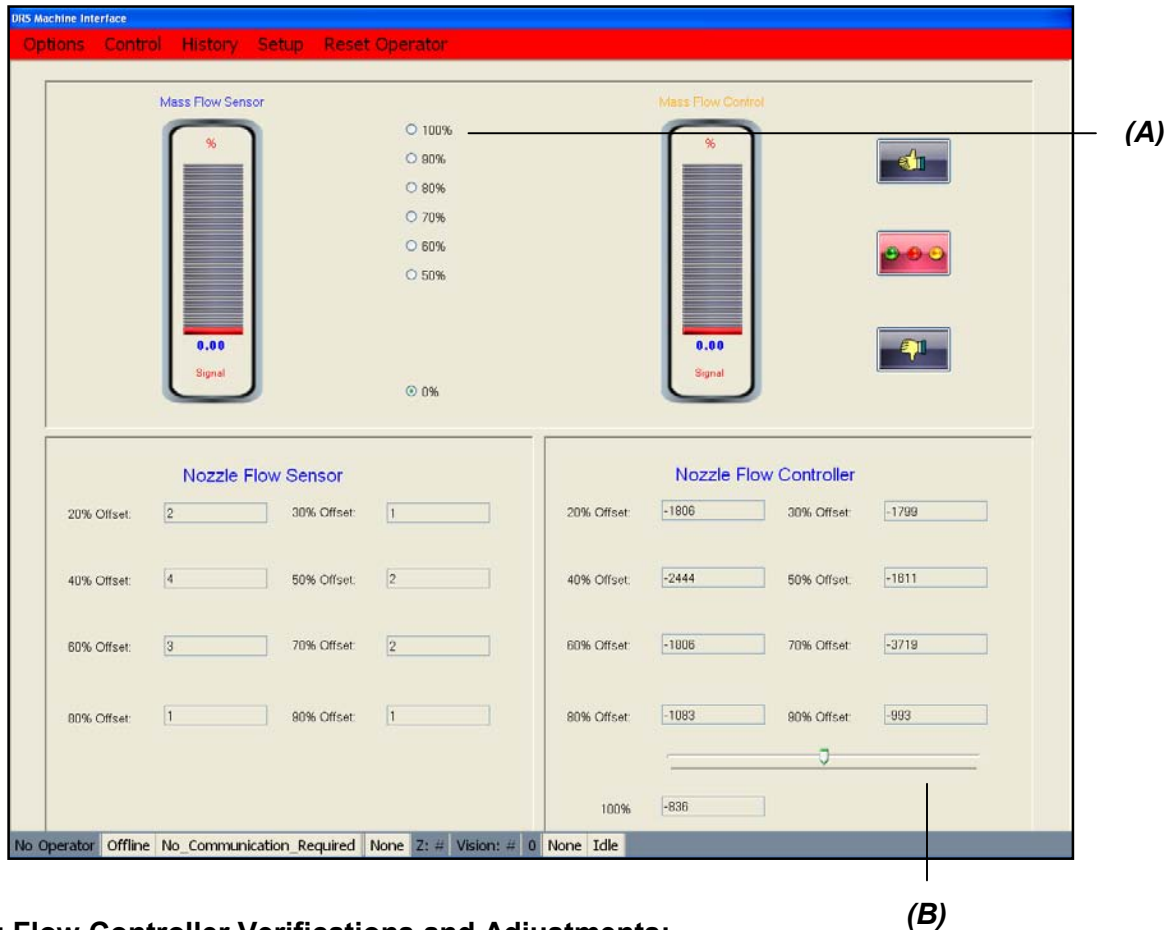
#### **WARNING:**

BE CERTAIN ALL HOSES ARE INSERTED INTO FITTINGS COMPLETELY. A BAD CONNECTION CAN RESULT IN A BURNED OUT HEATER OR ERRONEOUS CALIBRATION READINGS.



**To access the Flow Adjustment Screen:**

1. Log on as “DRS25” or any “high level” security operator and select the Thumbs Up icon.
2. Using right side mouse button, click the Air-Vac logo. You are now in the ‘Hidden’ Setup window.
3. Select Setup from the menu bar.
4. Select Nozzle Flow Meter. The Nozzle Flow Adjustment screen will appear as shown below.



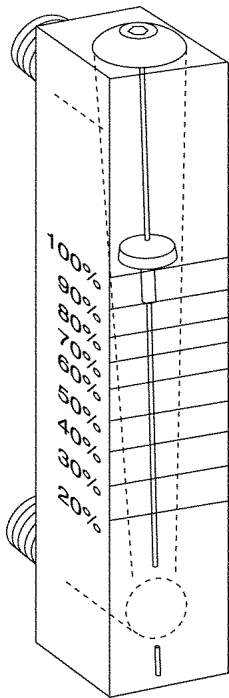
**Making Flow Controller Verifications and Adjustments:**

5. Click on the 100% radio button (A) on the Flow Adjustment Screen. The airflow will activate after 1-4 seconds.
6. Wait 45 seconds before making any adjustments.
7. Check the 100% scribe line on the flow meter. If the flow meter reads too high or too low, adjustments can be made immediately by dragging or clicking on the track bar within the Nozzle Flow Controller group box (B). The airflow should not be interrupted. The adjustments will be automatically applied and stable within 3-5 seconds. The track bar is always connected to the active flow rate helping to minimize incorrect adjustments.

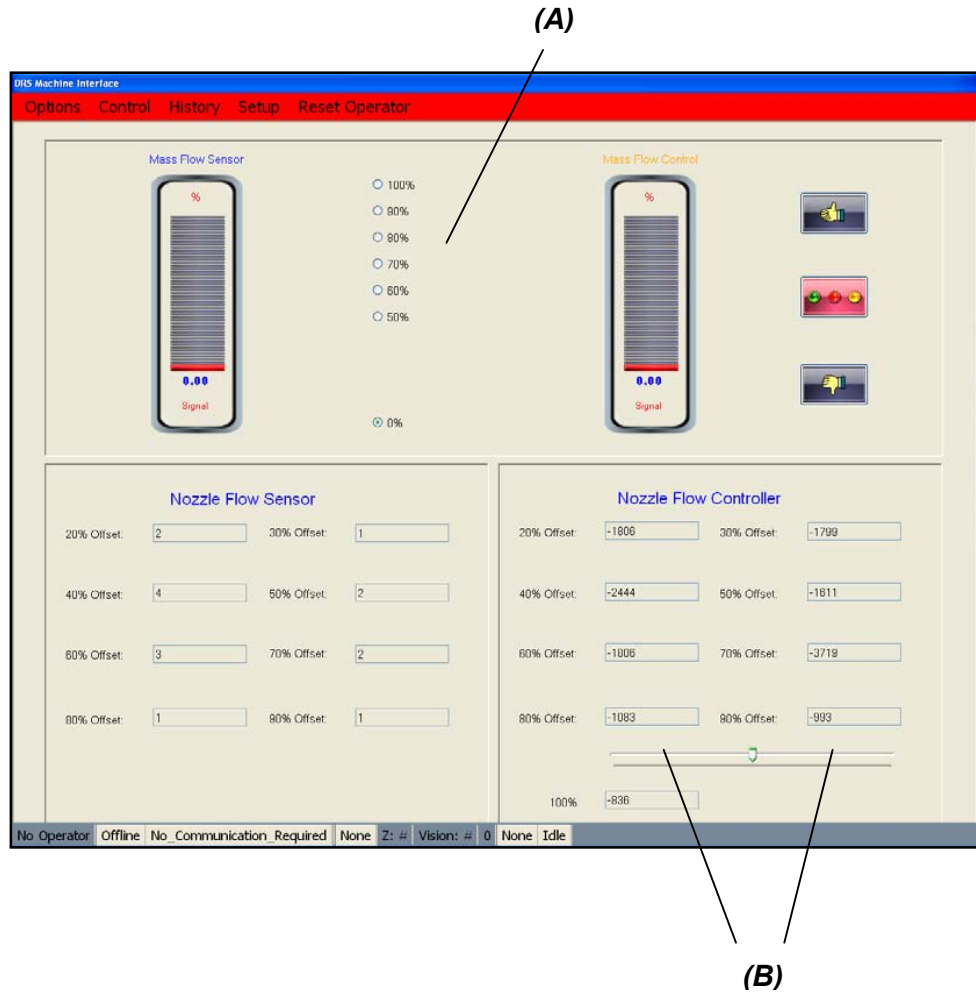
**Note:**

NO ADJUSTMENT IS NECESSARY IF THE FLOW IS OFF BY LESS THAN THE THICKNESS OF THE FLOAT +/- . READ THE BOTTOM OF FLOAT HEAD (LARGEST DIAMETER).

**Flow Meter:**



**Air Flow Table:**



**Note:**

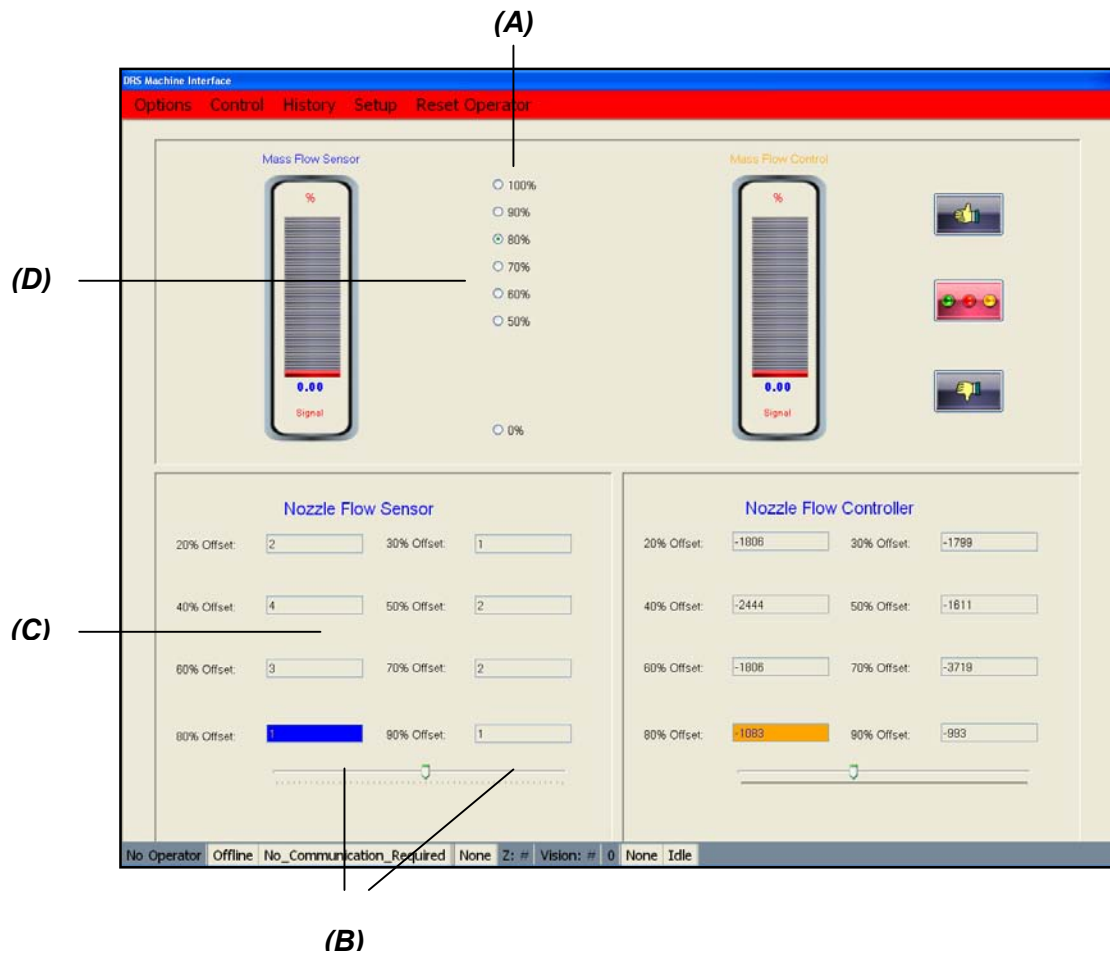
IT IS RECOMMENDED THAT YOU USE THE TAB KEY TO ENTER INTO THE ADJUSTMENT BOX TO CHANGE THE SETTING.

8. If the flow meter reads too high, decrease make 2 clicks on the left side of the track bar (not on the sliding bar position) (B).
9. If the flow meter reads too low, increase make 2 clicks on the right side of the track bar (not on the sliding bar position) (B).

Once the 100% Flow Controller value has been set, check flow controller verifications for 20-90% settings (A). With the nozzle flow system activated for the various settings, check the flow using the meter. Adjust the nozzle flow controller computer value (B) as required until the float corresponds to the scribed setting.

**Making Flow Sensor Verifications and Adjustments:**

1. Click on the 100% radio button (A) on the Flow Adjustment Screen. The air flow will activate after 1-4 seconds.
2. Wait 45 seconds before making any adjustments.
3. The software screen displays to the operator a Yellow meter (flow rate set point) and a Blue meter (actual flow rate sensor reading).
4. Check the blue meter that is being displayed on the software screen. This meter represents the actual flow rate sensor output from the flow controller.
5. The blue meter should bounce between 99-101%. If the blue meter is not within this range, adjustments can be made to the 100% Nozzle Flow Sensor value.
6. If the blue meter is too high, increase the value by making 2 clicks (B) on the right side of the track bar (not on the sliding bar position)
7. If the blue meter is too low, decrease the value make 2 clicks (B) on the left side of the track bar (not on the sliding bar position).
8. Retest for 20-90% Flow Sensor values (C) for each nozzle flow setting (D).



**Making Flow Sensor Verifications and Adjustments:**

**Note:**

AFTER COMPLETING THIS CALIBRATION PROCEDURE, THE OPERATOR SHOULD QUICKLY RUN THROUGH ALL OF THE FLOW SENSOR RANGES (20-90%). THE PURPOSE OF THIS STEP IS TO ASSESS THE OVERALL PERFORMANCE OF THE FLOW SYSTEM.

9. Select the Thumbs Up icon to save changes and exit the Flow Adjustment screen.

**IMPORTANT!!!**

DISCONNECT THE BLUE FLOW METER HOSE FROM THE FLOW CALIBRATION FITTING AND RECONNECT THE BLUE UPPER HEATER HOSE. FAILURE TO RECONNECT THE UPPER HEATER HOSE PRIOR TO RUNNING THE TOP HEATER WILL CAUSE THE TOP HEATER ELEMENT TO FAIL.

| <u>Software Screen</u> | <u>Flow Meter</u><br><i>Target Value</i> |
|------------------------|--|
| 20%                    | (20% scribe): .55 scfm                   |
| 30%                    | (30% scribe): .82 scfm                   |
| 40%                    | (40% scribe): 1.10 scfm                  |
| 50%                    | (50% scribe): 1.37 scfm                  |
| 60%                    | (60% scribe): 1.65 scfm                  |
| 70%                    | (70% scribe): 1.92 scfm                  |
| 80%                    | (80% scribe): 2.20 scfm                  |
| 90%                    | (90% scribe): 2.47 scfm                  |
| 100%                   | (100% scribe): 2.75 scfm                 |